

**Eco Team Work Session - notes**  
October 24-25, 2005 at EPA Seattle offices

Attendees: Eric, Joe, Rob, Jeremy, Jennifer, Chris, Mikell, Burt, Val

**Ecological CSM**

The Eco Team reviewed the revised CSM and pathway determinations for the completeness and significance of each pathway to the receptors of concern. The team reached consensus on all pathway determinations to finalize the CSM. Major thanks to Rob, Jennifer, Joe, Chris and Jeremy for their great “subgroup” work on this.

**Next steps**

We need to compare our revised CSM with the LWG’s proposed CSM and provide justification for the major changes made. In addition, we need to describe our expectations for how the CSM will be used. We will document this and include it in our direction to the LWG.

The Team agreed that for our next meeting (November 1-2) it would be helpful to have a color coded version of our revised CSM that highlights the pathways deemed “complete and significant” and “complete and significance unknown,” as well as shading that indicates areas where we have data and areas where data gaps exist (on both the right and left sides of the CSM). **Eric and Joe agreed to make these changes and send the revised CSM to the Eco Team on Monday, October 31.**

**Proposed Management Objectives**

The team reviewed proposed management objectives to be added to the Problem Formulation section of the Portland Harbor Workplan, Appendix B (describing the ERA), as well as rationale for adding the objectives. Notes from our conversation follow.

- In addition to the justification proposed by the Tribes, having management objectives for the PH ERA would help guide our professional judgments and our decisions about how much uncertainty we’re willing to accept for different species.
- We don’t have management objectives now; we have RAOs in the AOC’s Statement of Work.
- Early on, we tried but failed to reach agreement on a vision statement for the PH cleanup.
- Management objectives would be helpful for communicating what we’re trying to achieve in the ERA and RI to both external and internal audiences, covering all of our receptors of concern.
- It would be nice to have concrete, clear objectives in our minds as we get more into analyzing the RI data; we could refer to them often.
- The RAOs in the Statement of Work talk about protecting “growth, survival and reproduction,” but they don’t tell us what we’re trying to protect in a broader sense, nor do they acknowledge the species of concern that we should be keeping in mind. The RAOs don’t say *why* we’re doing what we’re doing, and they don’t give us guidance for how much uncertainty we should accept for different species.
- Note: We need more clarity on the measurement endpoints in the Assessment Endpoint Table.
- Restoration and protection is essential to the Tribes, and being specific about what our cleanup levels will address is extremely important.
- EPA guidance requires us to have a Problem Formulation statement and management objectives. Adding them now would help guide future FSPs and data priorities.
- Management objectives would be helpful. Not having them means we’re missing a mechanism to bring us together with the LWG on significant issues. We need a common basis for talking about some of the big needs and issues that we’re facing.

- In addition, we need some agreement about the *scale* of our efforts; what we're trying to do in the ERA.
- Another question we need to address is how to assess "special status" species, like sturgeon that aren't ESA listed but are culturally important to the Tribes. In addition, we need to agree on adult salmonid, adult sturgeon and adult lamprey exposure scenarios and where we want to go with this.
- Consensus of group: we should pursue the development of management objectives for the ERA, but not to the extent that it holds up our other important work.
- The objectives should be simple, clear, and based on EPA risk assessment guidance. They should also stick to the ERA process and goals. In addition, we should incorporate assessment objectives in what we develop, and make sure we're consistent and comfortable with our measurement endpoints.
- The objectives will need to acknowledge a balance between the "working river" and "restored ecosystem" functions of Portland Harbor.
- Agreement on management objectives could bring us and the LWG more in-line with our proposals and perspectives in moving forward.
- Questions for our team at some point: Will we *prescribe* management objectives, or would they be *negotiable* with the LWG? We'll decide on this after we agree internally on what the objectives will be.

#### Next steps

The Eco Team decided that we will review management goals and objectives from other Superfund sites (Coeur D'Alene, Duwamish, Commencement Bay, Hudson River, Fox River, New Bedford, etc.) as examples of what we might consider using for Portland Harbor. We would also look at any existing direction in Portland Harbor documents (i.e., in the AOC and Statement of Work, other documents?) related to what we're trying to accomplish and objectives of the clean up. **El agreed to send this information to the Eco Team for review by Friday, October 28.**

Then, if the team decided it was needed, we agreed we will develop management goals/objectives for Portland Harbor related specifically to the ERA process and goals, and based on EPA risk assessment guidance. We would incorporate assessment objectives in what we develop and make sure we're consistent and comfortable with our measurement endpoints.

In the end, our product will include:

- Introductory text that includes (1) explanation of how management goals/objectives will affect the RI/FS, RDRA and cleanup process, (2) a statement of the need to balance the "working harbor" and "restored ecosystem" functions of Portland Harbor, and (3) acknowledgement that management goals/objectives will provide a stronger, clearer foundation for cooperation among EPA, partners and the LWG.
- Management goals/objectives
- the Ecological CSM
- the Assessment Endpoint Table
- Measurement Endpoints

This will be a main part of our packaged direction to the LWG in early/mid-November.

#### Approach for doing the ERA

The Team discussed priority areas where we need to guide the LWG in conducting the ERA, and generated the direction below. We noted that our direction needed to be consistent with the revised Assessment Endpoint Table, the Ecological CSM and the Data Needs Table we created, and it should include clear justification to explain our rationale. (Note: The team will revisit the notes below to ensure adequate justification is provided.)

#### Approach for assessing risk from PAHs to resident and anadromous fish

We are interested in assessing the risk from PAHs to resident and anadromous fish, and we have data that tells us that some fish may be more sensitive to PAHs than others. For example, data on juvenile salmonids shows that when exposed to PAHs, they experience immunocompetence; data on brown bullhead shows they experience skin lesions from PAH exposure; and data on flounder shows they experience liver lesions from PAH exposure. Exposure scenarios for birds and mammals relate to spills, sheens and tar-oil bodies in the river, and other laws and regulations adequately cover these types of events. Thus, we're not as concerned with assessing PAH risk to these receptors in the ERA. In addition to fish, however, we will assess PAH risk to the benthic community (i.e., clams), but this may not be a data gap at this point.

Currently, to assess risk to fish from PAHs, the LWG proposes to use (1) the dietary approach and (2) water exposure related only to a single PAH compound compared to Ambient Water Quality Criteria (AWQC). These methods will not be sufficient for assessing PAH risk to fish because (1) the inadequacy of dietary TRVs and the inability accurately to model dietary exposure limits the effectiveness of the dietary approach, and (2) PAHs may have a *combined* effect on fish and it is important to consider potential combined effects in assessing risk.

Thus, the following methods can/should be used to assess fish exposure from PAHs, and the government team may give more weight to these lines of evidence than what is given to the dietary approach.

- Biliary FACs (fluorescent aromatic hydrocarbons) – the first step in assessing PAH exposure is analysis of FACs in fish bile. This is (and may be more than) a biomarker (i.e., a biological or physiological attribute of an organism that can be correlated to a measure you're interested in, like toxicity, and at times can be correlated to an effect).
- Measuring juvenile salmonid immunocompetence (susceptibility to disease from PAH exposure; through exposure challenge studies)
- Use sediment thresholds derived by the NOAA Science Center for linking incidence of fish lesions with sediment concentrations (i.e., run bioassays in high PAH areas and use existing sediment data and sediment quality guidelines)
- Do toxicity testing for fish and invertebrates
- Use invertebrate surrogate toxicity to protect fish from PAHs (note: we may have a data gap related to the invertebrate-PAH link)
- Develop a species sensitivity distribution to create sediment guidelines
- Compare water column PAH data to pseudo screening numbers in the EPA sediment equilibrium partitioning guidance document
- Use the "Sum PAH" test (developed in Newport, OR) for amphipods and other species
- Cytochrome P450s (as they relate to DNA adducts)

To assess the affect of PAH exposure to fish, we should use DNA adducts (contaminant specific DNA errors that can be traced back to specific contaminants).

For future discussion – the Eco Team needs to decide how we'll weight different lines of evidence and include this in our direction to the LWG.

Note: Parametrix is collecting information on how risk from PAHs has been assessed at other sites, and will provide that information to the Team soon.

#### Approach for assessing risk from metals to fish

Currently, to assess risk to fish from metals, the LWG proposes to use (1) the dietary approach and (2) comparisons of water metals concentrations to AWQC (we're relying on AWQC to be protective of all

fish). These methods are not adequate for assessing risk to fish from metals exposure because our understanding of gill binding toxicity is limited. As options, we could do biomarkers for metals and use the Biotic Ligand model that EPA is developing.

The Team agreed that Portland Harbor is a PCB and PAH site, and rather than pursuing the additional lines of evidence noted above for assessing risk from metals, we should focus our effort on PCBs and PAHs except in localized areas of metal contamination. In these areas, we will rely on (1) toxicity to the benthic community to assess metals risk (we can't use tissue residue because fish regulate metals), and (2) look at fish-specific water TRVs, which are more reliable and cost-effective than doing biomarker-specific metals evaluations for fish.

#### Approach for assessing risk from metals to other receptors (inverts, clams, birds, etc.)

The TRV/direct toxicity assessment is sufficient for assessing risk to clams and invertebrates. For birds, the proposed dietary approach for assessing metals risk is sufficient, with the possible exception of getting verifiable tissue data. (Note: we need a plan for getting this data; will look at dietary ligature confirmation, which can be used for metals risk and organochlorines risk. We'll add this to the data needs table and prioritize it with other data needs; it's likely to be a need at specific site locations (Arkema Early Action?). The data need is for bird tissue data, either from juveniles or their prey species, because eggs don't work for metals. Swallows are often used at PCB sites.)

#### Approach for assessing risk from organometals to fish

Currently, to assess risk to fish from organometals, the LWG is proposes to use (1) TBT risk to clams and mussels, and (2) a TBT sediment number protective of salmonids feeding on invertebrates (note: we need to check on whether they're using this number). TBT (tributyltin) is highly toxic to gastropods and is bioaccumulative in invertebrates.

[Need to add a statement of whether the proposed approaches are sufficient, and why or why not.]

To assess risk to fish from organometals, the LWG should use the Meader paper (an assessment of TBT effects on salmonid prey species). We will likely need localized TBT risk assessment for TBT contaminated sites.

- Note: It appears that the Meader paper is not protective of gastropods or mollusks. For gastropods, we are not interested in protecting them as endpoints themselves, but we are interested in gastropod bioaccumulation and how this affects birds. We do want to protect mollusks as endpoints, however, and we could use a TRV approach for assessing risk from organometals and compare this to the Meader paper's recommendation of a sediment cleanup level that is ten or more times lower than 6,000 ng/g organic carbon.

#### Approach for assessing risk from PAHs and metals to plants

(Some uncertainty exists about what method the LWG has proposed for assessing risk to plants; possibly using a qualitative approach to compare water concentrations to AWQC and other TRVs for plants.) Parametrix is doing a screening level risk assessment for plants and developing plant TRVs; will report back to Eco Team soon.

#### Approach for assessing risk from mercury to fish and invertebrates

For assessing risk to fish and invertebrates from mercury, the LWG proposes to use (1) the benthic interpretive model and (2) the tissue residue approach. These approaches are adequate.

#### Approach for assessing risk from mercury to amphibians, birds and mammals

For assessing risk to amphibians, birds and mammals from mercury, the LWG proposes to use (1) the dietary approach and (2) evaluating the accumulation of mercury up through the food chain to birds. This

approach is adequate, but we may need to review the TRVs to ensure they're appropriate and protective enough.

#### Approach for assessing risk to lamprey, Chinook and sturgeon

Currently, the Assessment Endpoint Table and the Ecological CSM identify sturgeon, juvenile lamprey and juvenile Chinook as receptors of concern. The Tribes would like *adult* lamprey and *adult* Chinook added as receptors of concern, because the adults are culturally significant to the Tribes and because complete pathways exist to these receptors that are not represented by other species or by the juveniles. In addition, they would like sturgeon, lamprey and Chinook to be assessed and protected at an *individual* level, rather than at a population level, because the Tribes consider these to be "special status" species warranting individual protection. The Eco Team discussed these issues as summarized below.

#### Assessing Sturgeon

Early on, the Eco Team decided that largescale sucker would represent adult sturgeon in the CSM and Assessment Endpoint Table because sturgeon tissue samples would likely show contamination gained from areas outside of the ISA. Sturgeon does receive contaminants from the food it eats in Portland Harbor, but the significance of this load compared to the total contaminants a sturgeon receives is unknown. The Team agreed that ensuring protection of largescale sucker would provide protection for sturgeon, but sturgeon were named in the CSM and Assessment Endpoint Table because of their significance to the Tribes and the community.

Currently, the proposed approach for assessing risk to sturgeon is through assessing and protecting resident fish as a sturgeon representative. Recent data has suggested higher site fidelity for sturgeon to the ISA, but we know that sturgeon move great distances and the amount of time they spend in the ISA remains unknown. Given this, it is important that we assume that sturgeon are in the Harbor 100% of the time, and consider the following additional lines of evidence.

- Collecting additional whole body tissue from sturgeon in a sensitive age range and analyzing the tissue for comparison to TRVs (note: we would need to determine what the most sensitive age range is; it may or may not be the "catchable" range for sturgeon). The Tribes want us to pursue this.
- Protect resident fish to provide protection for sturgeon, and model contaminant concentrations in sturgeon through the Food Web Model to verify our protection of them. This approach puts more weight on the assessment resident fish, and it's likely that the model will result in a greater level of protectiveness of sturgeon than would protections based on field collected sturgeon tissue.
- Pursue the second option (modeling) and collect whole body tissue from catchable sturgeon to calibrate the Food Web Model. Note: the team felt that we can not accurately relate contaminant concentrations in adult sturgeon to contaminant levels at the site, and whether we can do this for juveniles is uncertain.

The Team needs to revisit this issue to clarify our preferred method of assessing risk to sturgeon.

In addition, the decision of whether to protect sturgeon at an individual or population level needs to be made. Eric noted that he and Chip will make a decision on this soon.

#### Assessing adult Chinook

The Eco Team agreed that adults are taking up contaminants in the ISA, but protecting juveniles will provide protection for adults. Early on, the Team decided to assess both salmon and lamprey in the ERA, and agreed to use juvenile Chinook and juvenile lamprey as assessment endpoints that would provide protection for all live stages. We could clarify our intent to protect salmon and lamprey in overall ERA management objectives.

Protection of juvenile Chinook does not take into account the effect of contaminants on returning, pre-spawning adults that may suffer impaired olfactory function from copper and other metals. Impaired olfactory function affects the ability of adults to find spawning sites and effectively reproduce. The Team agreed that if surface water metal concentrations exceed known affect levels for adults, the ERA needs to consider this. The Team also supported the use of TRVs to look at physiological and other effects for adults.

The bioaccumulation pathway for adults is insignificant. It only exists for yearlings and sub-yearlings that are eating invertebrates during their time in the ISA, and because of growth dilution, the uptake of bioaccumulates in the Harbor for juveniles is insignificant compared to what they're getting in the ocean during growth.

The Team agreed to change the Assessment Endpoint Table to note "Chinook" as an endpoint, with two subsequent categories/boxes for "juveniles" and "adults." For assessing "adults," the table will note that adults will be assessed only for olfactory function of returning, pre-spawning adults, tied to water column contaminant concentrations, and how changes to olfactory function may affect swimming and homing behavior. Justification for adding this adult Chinook assessment endpoint is (1) it represents a unique exposure-receptor pathway, and (2) it is tied directly to salmon survival and reproduction.

#### Assesing lamprey

The Eco Team decided early on to assess and protect lamprey in the ERA, and agreed to use juvenile lamprey as the assessment endpoint, recognizing that protecting juveniles would provide protection to the adults. The majority of the Eco Team (EPA, DEQ, USFWS, NOAA) agreed that the assessment of adult lamprey was not relevant to the ERA, however, but it may be relevant to the HHRA and the HH Team should consider this. The Tribes disagreed, stating that adult lamprey are relevant to both the ERA and the HHRA because they take up a significant amount of contamination in the ISA, they spend a significant amount of time in the ISA, they burn fat stores as adults that they accumulated as juveniles, and it remains unclear whether the most sensitive life stage is the juvenile or adult stage, and how much of their total contaminant load comes from the ocean verses the ISA.

All members of the Team agreed that we need to talk with lamprey experts to come to consensus on this and develop recommendations on how best to assess lamprey. **Joe and Chris agreed to develop some guiding questions for the Eco Team's meeting with the lamprey experts, and send them to the Team by early November.**

In addition, **Joe and Chris agreed to fill out the CSM pathways for adult Chinook and adult lamprey for the team's consideration.**

#### Future discussion on the ERA approach

At the November 1-2 Eco Team work session in Portland, the team will continue our discussion of the ERA approach. Specifically, we'll consider the following areas and identify additional areas where direction is needed.

- Approach for developing BSAFs for clams, crayfish and sculpin
- Approach for assessing risk to the benthic community
- Scale of the ERA
- Approach for assessing risk in the riparian area – as part of this, we will finalize our definition of the riparian area and describe how this area should be assessed

## **Food Web Model**

On November 4, the LWG plans to deliver a report on their proposed Food Web Model, including detail on the parameters they're using and the structure of the model itself. Given this, the Eco Team agreed that we will likely not include direction to the LWG on the FWM in November, but work with what they provide us in the report to move forward.

## **Upcoming Eco Team Work Sessions and related meetings**

November 1-2: Eco Team work session in Portland, DEQ NWR, 1<sup>st</sup> floor, room 1A (Tuesday 10-5, Wednesday 8 – 4:30)

- Finish direction to the LWG on the ERA approach
  - o Approach for developing BSAFs for clams, crayfish and sculpin
  - o Approach for assessing risk to the benthic community
  - o Scale of the ERA
  - o Approach for assessing risk in the riparian area – as part of this, we will finalize our definition of the riparian area and describe how this area should be assessed
  - o other areas of the ERA approach as identified by the group
- Agree on management goals/objectives to guide the ERA
- Begin prioritization of data needs table and refine justification for the data needs identified to ensure it is adequate
- Note: Develop justification for major changes made in the revised Eco CSM; refine justification for changes in Assessment Endpoint Table. *A small subgroup may be able to take a first crack at this on the Team's behalf.*
- Note: Break for November 2 conference call on PAHs from 9:00 to 10:30 a.m.

November 7: Eco/CSM Integration meeting in Portland DEQ NWR, 4<sup>th</sup> floor, A/B, 10-5

November 8: conference call with Lyndel at 2:30 p.m.

November 9: Eco Team work session in Portland DEQ NWR, 4<sup>th</sup> floor, room A/B, 8-3

- Finish prioritization of data needs
- Finalize direction to the LWG on the ERA

*Note: the next major meeting needs to be in Seattle*

Future meetings:

- Food Web Model meeting
- Meeting with LWG to discuss key aspects of ERA direction from the government team